

# HEAVY DUTY SOCK ANCHOR

## Grout-injection sock anchoring system to repair and strengthen masonry

The Heavy Duty Sock Injection Grout Anchor System is a fully engineered technical solution for strengthening all masonry structures including bridges, arches, historic buildings, monuments, and high rise structures. It is an ideal solution when high shear loads are being considered during the design or where weak and poor quality substrates are present. It is available in standard lengths that can be coupled together to form longer anchor assemblies. The anchor assemblies are shipped palletized, allowing for easy on-site assembly. The anchors and companion injection grout have been tested at the Imperial College of London.



**EASY TO INSTALL**



**DURABLE**



**CORROSION-RESISTANT**



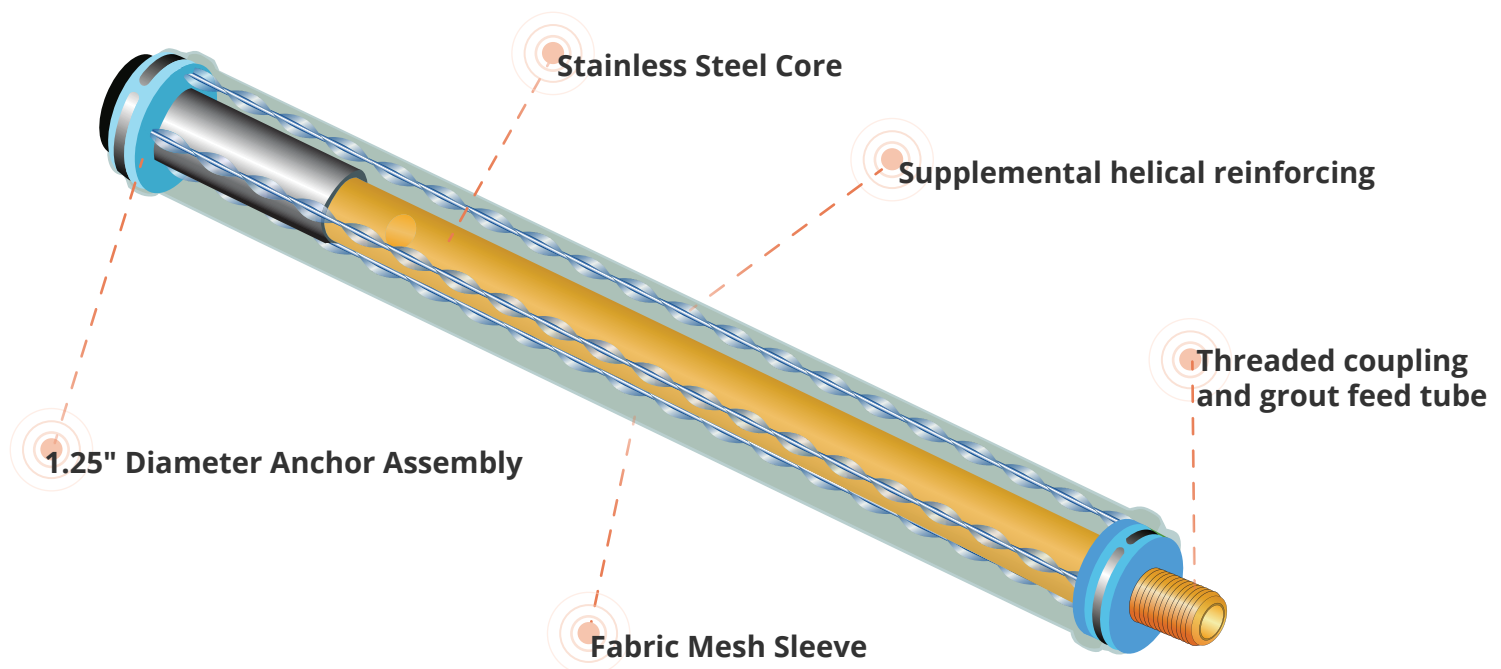
**TYPE 304  
STAINLESS STEEL**



**EASY POST-INSTALL  
QUALITY CONTROL**



**SECURES VARIETY OF  
WALL MAKEUPS**





# HEAVY DUTY SOCK ANCHOR

## Grout-injection sock anchoring system to repair and strengthen masonry

### Overview

The Heavy Duty Sock Anchors are very easy to install. Simply drill your hole using an SDS Max Drill, core bits or diamond drills. Clean the holes, screw the blanking plug into the end anchor and push the anchor into the drilled hole, connecting the anchors to the desired length. Screw the pipe onto the end, mix the grout, put it into a pneumatic gun and fill the anchor. Once the grout milk is seen running from the hole, stop the pumping and let it relax for a few minutes. Clamp the pipe and remove the gun. Leave for at least an hour, then remove the pipe and clamp.

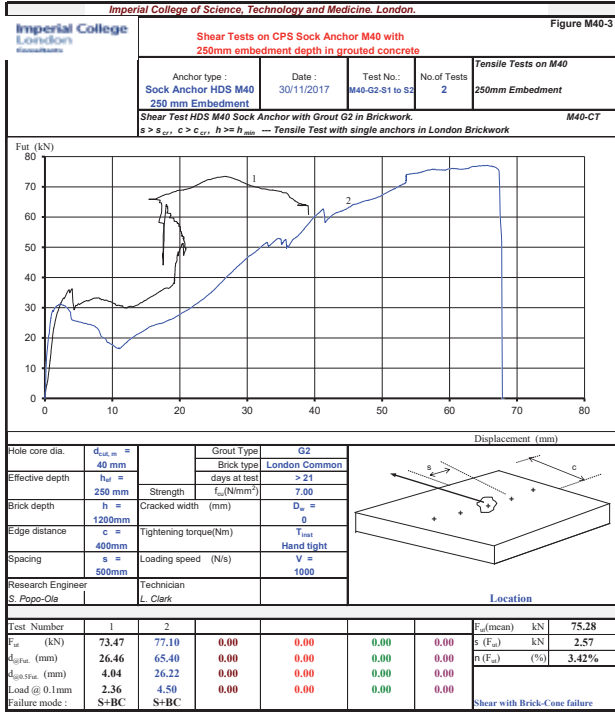
Sizes available: 6", 10", 20", and 40"



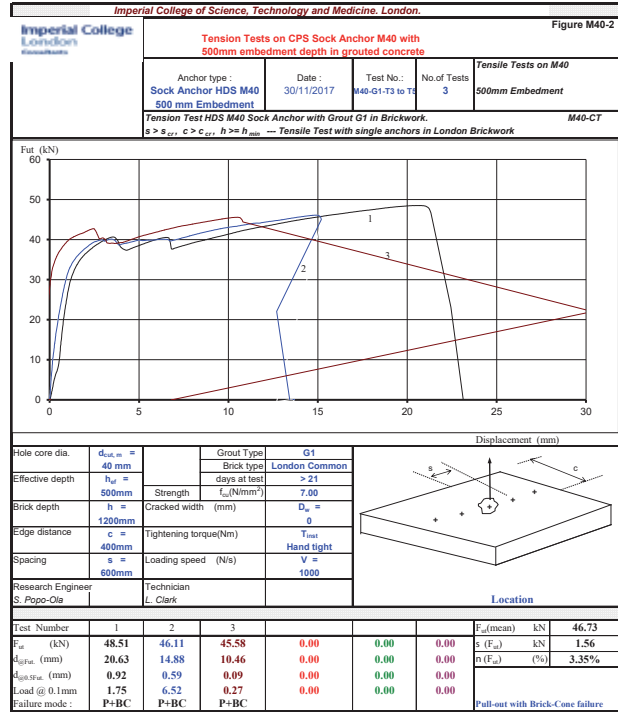
### Technical Information

- Drill hole size: 1-1/2" to 2-3/8"
- Standard lengths: 150 mm (6"), 250 mm (10"), 500 mm (20"), and 1000 mm (40"). [shorter lengths can be coupled together to form longer assemblies]
- Structural core size: 14mm (9/16")
- Coupling tensile strength: 45.4 kN (10,200 lb)
- HDS Injection grout 28 day compressive strength: 65 N/mm<sup>2</sup> (9,430 psi) when Tested to EN-196-1, EN 196-3, EN 445, EN 446

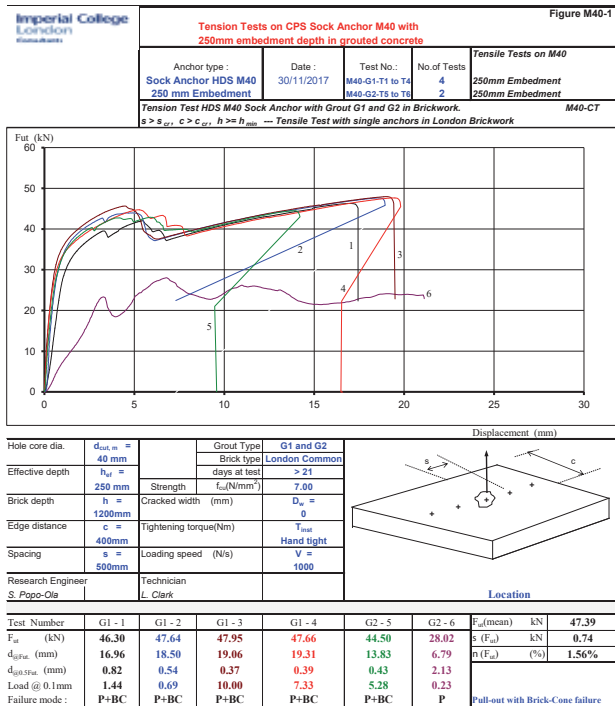
## SHEAR TESTS 250MM (10") EMBEDMENT



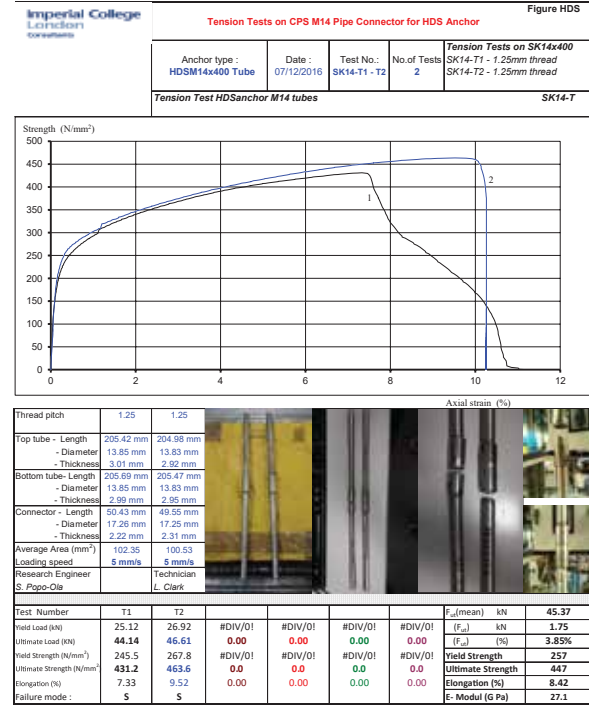
## TENSILE TESTS 500MM (20") EMBEDMENT



## TENSILE TESTS 250MM (10") EMBEDMENT

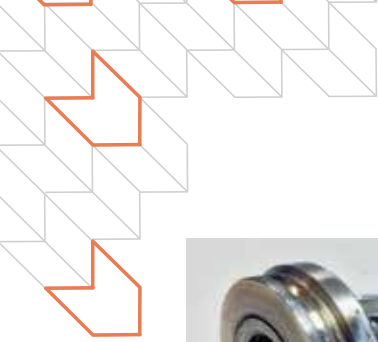


## COMPONENT TESTS



## TEST DATA SUMMARY

HOLE DIAMETER	EMBEDMENT	SUBSTRATE	ULTIMATE TENSILE STRENGTH	ULTIMATE SHEAR STRENGTH
40 mm (1-9/16")	250 mm (10")	Brick	46.77 kN (10,500 lb)	75.28 kN (16,900 lb)



### Test Standards for Sock Anchors grouted in Brickwork

Test Ref.	Test type	Anchor depth	Failure load	Failure mode	Manufacturer Ref.
T40-G1-1	Tension	250 (10")	46.30 (10.4K)	P + BC	HDS-M40-G1-T1
T40-G1-2	Tension	250 (10")	47.64 (10.7K)	P + BC	HDS-M40-G1-T2
T40-G2-1	Tension	250 (10")	44.50 (10K)	P + BC	HDS-M40-G2-T1
T-S40-G1-1	Tension	250 (10")	47.95 (10.8K)	P + BC	HDS-M40-G1-TS1
T-S40-G1-1	Tension	250 (10")	47.66 (10.7K)	P + BC	HDS-M40-G1-TS2
T40-G1-3	Tension	500 (20")	48.50 (10.9K)	P + BC	HDS-M40-G1-T3
T40-G1-4	Tension	500 (20")	46.11 (10.4K)	P + BC	HDS-M40-G1-T4
T40-G1-5	Tension	500 (20")	45.58 (10.2K)	P + BC	HDS-M40-G1-T5
S40-G2-1	Shear	250 (10")	73.47 (16.5K)	S+ BC	HDS-M40-G2-S1
S40-G2-2	Shear	250 (10")	77.10 (17.3K)	S + BC	HDS-M40-G2-S1

P + BC Pullout with Brickwork Cone failure

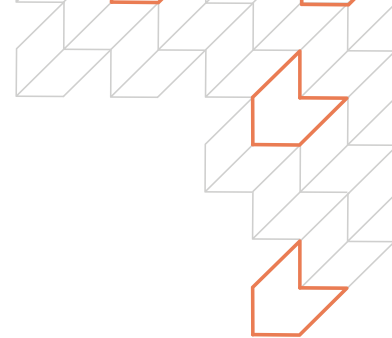
S + BC Shear with Brickwork Cone Pryout failure P Pullout by hand failure

### RESISTANCE OF CONCRETE TO RAPID FREEZING AND THAWING

Tested in Lichtenstein, Germany. Product : HDS Injection Grout EU. Report number: 2018/569/209.

Tested to DIN EN 1542 & DIN EN 772-22.

INSPECTION CHARACTERISTICS	TEST SPECIFICATION	TEST PERIOD FROM 19.02.2018 UNTIL 30.05.2018			GROUT CONSUMPTION	
		Initial value	Final value	Difference	Drill Hole Size	Grout consumption per 20kg (44 lb) bag
Cycles	Freeze-Thaw-Cycles in water at -18	0 Cycles	200 Cycles	N/A	32mm (1.25")	15.5m (53 ft)
Weight loss	PVFTW01	555.5 g (average weight of test specimens)	555.5 g (average weight of test specimens)	0%	37mm (1.5")	11.6m (37 ft)
					40mm (1.56")	9.9m (34 ft)
					45mm (1.75")	7.8m (27 ft)
					50mm (2.0")	6.3m (21 ft)
					55mm (2.25")	5.2m (17 ft)
Decreasing Flexural strength	PVFTW01	9.87 Mpa (Mpa corresponds to N/mm')	9.40 Mpa (Mpa corresponds to N/mm')	4.76%	60mm (2.375")	4.4m (13 ft)
					52mm (2.05")	5.2m (17 ft)
Decreasing Compressive strength	PVFTW01	82.33 Mpa	77.74 Mpa	5.58%		
Adhesion capacity	EN-1542	2.54 Mpa	2.2 Mpa	0.34 Mpa		
Visual assessment	PVFTW01			None visible		



# HDS INJECTION GROUT

## Description

HDS Grout is a specially formulated Portland cement powder mix designed for the grouting of structural anchors and cables in post-tensioned concrete for EN 446(2007) and CARES Appendix PT10 procedures.

The mix design consists of a blend of fine and ultra fine cements plus a set of synergistic admixtures. The grout powder is packaged in 20kg (44lb) durable, moisture resistant bags ready for onsite mixing.

The material readily mixes with water to produce a particularly fluid flowing grout which will penetrate and fill fine voids within and around the anchors and cables then harden without shrinking to give a high strength product.

Particular advantages of the product include a quick and easy mixing with water producing a flowing mix which promotes penetration into confined spaces. The grout is shrinkage compensated and contains a powerful corrosion inhibitor to protect the cables and anchors.

Once hardened and cured, high compressive strengths are achieved giving resistance to static and dynamic stresses. HDS Grout has a total chloride, sulphate and sulphide-ion content below that specified in EN 447 CARES PT10.

## Other uses include:

- Grouting of cable ducts, voids and fine fissures.
- Support of cable anchor plates and ground anchors.
- To provide bearing or contact between structural anchor components.
- Grouting behind shafts and tunnel linings.
- Underpinning, loose floor and road slabs.

## Standards

HDS Grout has been tested in accordance with the appropriate parts of the following standards: EN445, EN446, EN447, EN196-1, EN196-3

## Specification Outline

Grouting works shall be carried out using HDS Grout as manufactured by Parex Ltd. The product must be stored, handled and used strictly in accordance with the manufacturer's instructions.





# HDS INJECTION GROUT

## Grout Properties @ 20°C (68°F)

Water content by weight 33% minimum to 35% maximum (6.6 to 7 litres (1.7 - 1.8gal.) per 20kg (44lb) bag).

## Compressive Strength Tested To EN 196-1 (W/P 0.35)

1 Day	3 Days	7 Days	28 Days
18N/mm <sup>2</sup> (2611psi)	40N/mm <sup>2</sup> (5802psi)	55N/mm <sup>2</sup> (7977psi)	65N/mm <sup>2</sup> (9427psi)

Typical results from EN445 testing at 33% water content.

Test type	Result specified in EN447:2007 & PT10	Result obtained by testing HDS Grout
2mm sieve test	No lumps	No lumps
Flow cone	T <sub>0</sub> >25s T <sub>30</sub> >25s and within 20% of T <sub>0</sub>	T <sub>0</sub> >14s T <sub>30A</sub> >14.3s and T <sub>30B</sub> >13.8s
Bleeding	Bleeding 0.3% max.	Bleeding 0.1%
Volume change	Volume change -1 to 5% max	Volume change -0.27% -0.27%
Compressive strength test	>27 N/mm <sup>2</sup> (3916psi) @ 7 days	84.5 N/mm <sup>2</sup> (12.3ksi) @ 7 days
Initial and final setting test (EN196-3)	Initial > 3 hours Final < 22 hours	

## Instructions for Use:

### Preparation

All necessary preparatory work must be completed before the grout is mixed. The fluid nature of the grout at 35% maximum water-to-powder ratio enables it to flow long distances in well prepared elements. Sufficient head should always be provided by positive pump pressure to ensure grout flow along or upwards drilled holes. Site trials may be carried out to confirm that suitable equipment is available and an appropriate water-to-powder ratio is chosen.

Clean holes with a brush and clean water to remove debris and pre-wet the substrate. Ensure that enough grout is mixed and available for the grouting operation to be completed in one continuous pour.

# HDS INJECTION GROUT

## Mixing

For each 20kg (44lb) bag of HDS Grout, a maximum of 7 litres (1.8gal) of water are required. For single bag mixes suitable mixing may be achieved using a high torque, slow speed drill with a Grout Stirrer. Pour the required quantity of clean water into the mixing vessel. Slowly add the HDS Grout to the water whilst continually mixing. Keep the mixed grout in a slow agitating holding tank prior to placing.

## Placing

Place mixed grout within 90 minutes of mixing.

Pour the mix into a pressure pot, air or battery-powered bulk gun, or bucket pump. Set compressor to a maximum of 44 psi.

Once ready to fill, slip a clamp over the exposed hose, then push fit the fill kit tubing into the open end. Switch on the compressor and proceed with pumping.

The Heavy Duty Sock Anchor system is back-filled, expanding the reinforced mesh sock to fill any voids, providing a permanent cementitious anchor to the surrounding masonry.

When the sock has been inflated, milk grout gently runs from the anchor, indicating that it is full. Maintaining the pressure at this stage forces the milk grout further into the surrounding material and minimizes shrinkage. As it cures, the high-performance grout firmly secures its reinforced core to create a structural entity that resists shear, compressive, and tensile forces.

Protect from freezing for at least 24 hours after placement.

## Precautions- Health and Safety

HDS Grout is alkaline when mixed with water and should not come into contact with skin or eyes. Avoid inhalation of dust during mixing and wear safety glasses, dust mask and gloves. If skin contact occurs wash thoroughly with clean water. Should eye contact occur rinse immediately with plenty of clean water and seek medical advice. Full health and safety data are given in Product Safety Data Sheet.

## Fire

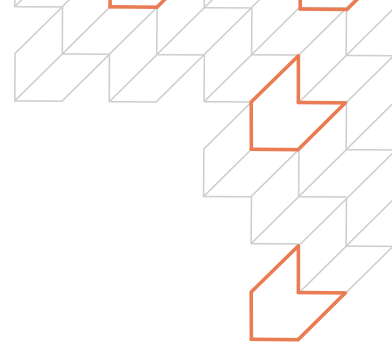
HDS Grout is non-flammable.

## Yield

Each 20kg (44lb) bag of HDS Grout will yield approximately 13 litres (793 cu in) of mixed material at water dose rate of 35%.

## Storage and Shelf Life

HDS Grout will have a storage life of 6 months in unopened bags when kept in dry conditions at a temperature between 5°C (41°F) and 35°C (95°F). Storage at higher temperatures and high humidity may reduce shelf life.



# INSTALLATION GUIDE



**1.** Mark the entry points as specified by the engineer and drill to the correct depth and diameter using either a core drill or an SDS Max rotary hammer to the specified diameter pilot hole size.



**2.** Ensure all drill dust and drill debris is removed from the pilot holes using a suitable air pump.



**3.** For short anchors, lightly spray the drilled pilot hole with clean water to maximize grout adhesion and facilitate a gradual and even grout cure. (Long anchors to be primed with water after assembly and insertion in the wall system).

**4.** Screw the blanking plug and washer into the end of the last HDS anchor until it bottoms and is snug tight. Couple together the standard 6", 10", 20", or 40" lengths together till they reach the specified length. Insert the assembled anchor into the drilled hole.



**Note:** do not force or twist the anchor as it is being pushed in to prevent damage to the fabric sock material.

**5.** Once the required depth is achieved, attach the supplied hose from the HDS Anchor Component Kit to the exposed end. Once all anchors are installed, mix the grout.



**6.** To mix the grout, add the appropriate amount of water first, then the powder and mix well using a paddle, until a very fluid but creamy uniform consistency is created. Always maintain the correct working ratio, as per the manufacturer's instructions. (6-7 liters maximum of water for each 20kg (44 lb) bag).



**7.** Pour the mix into a pressure pot or appropriate grout gun. Set the maximum pressure to 44 psi.



**8.** Once ready to fill, slip a clamp from the HDS Grout Fill Kit over the exposed hose, then push fit the provided pipe into the open end and proceed with pumping.



**9.** The HDS Sock Anchor system is back-filled, expanding the reinforced mesh sock to completely fill any voids, providing a permanent cementitious fixing to the surrounding masonry.



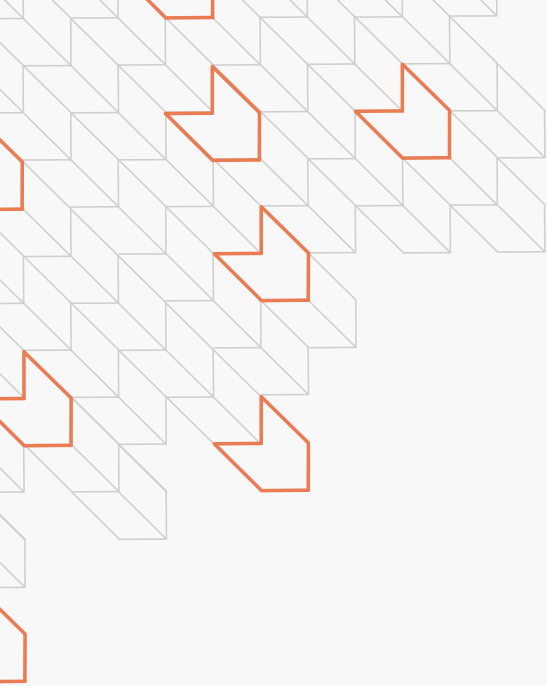
**10.** When the sock has been fully inflated, milk grout gently runs from the anchor indicating that it's full.



**11.** Maintaining the pressure at this stage forces the milk grout further into the surrounding material and minimises shrinkage. As it cures, the high performance grout firmly secures the helical bars and structural core tubing to create a single structural entity that resists shear, compressive, and tensile forces.



**12.** After a few minutes, fasten the clamp before turning off the compressor. It is advisable to remove the hose from the threaded tube 2-3 hours after installation. Wash any excess grout off with clean water, then fill the holes with a color matched mortar or other specified patching compound.



**JOHN**  
**Field Support**

Our on-site service includes troubleshooting, training and installation support.



**JEFF**

**Engineering Support**

Engineering details and personalized solutions for your specific needs.



# You. Us. The project.

We strive to provide the best construction products on the market, but we also know this business is about people. That's why we dedicate our human resources and services to make your job easier. Our nationwide network of sales representatives is here to do whatever we can to help solve your job-site problems.

## **BRIAN** Field Support

We come to you to support your projects when and where you need us.



## **COLLEEN** Customer Care

We're real live people who answer the phones!  
Really. We're here M-F, 8a-5p, CST.





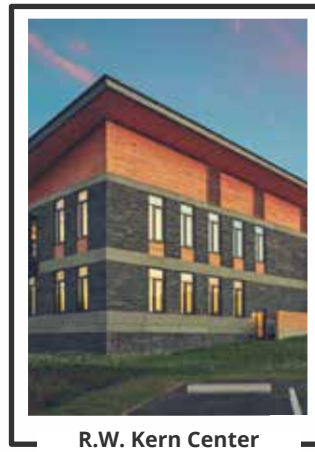
Grand Central Station  
New York, NY



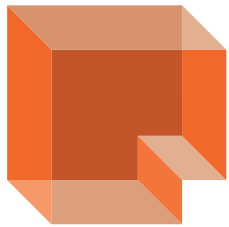
Wrigley Building  
Chicago, IL



United States Capitol  
Washington D.C.



R.W. Kern Center  
at Hampshire College



# PROSOCO

## You. Us. The project.

